NPS Air Resources Division Review of Gas Transmission NW Compressor Stations 12 & 13

07/07/2021

Gas Transmission Northwest Compressor Station No. 12:

- The company did not use the most recent 7th edition CCM. Why wasn't the most recent version of the CCM SCR chapter used?

- The company assumed a 75% control efficiency. This seems low for SCR. What is the basis for this assumption? As described below, our analysis assumed 90% control. This is equivalent to a controlled NOx limit of 0.037 lb/MMBtu for unit 12-A and 0.017 lb/MMBtu for unit 12-B. The CCM states: "In practice, commercial coal-, oil-, and natural gas–fired SCR systems are often designed to meet control targets of over 90 percent."

  We reviewed the most recent (2020) CAMD information to verify whether the NPS assumed emission rate at 90% control was reasonable (i.e., achieved in practice) for natural gas-fired combustion turbines—we did not include combined cycle units in this review. There are over 100 combustion turbines in the CAM database with emission rates at or below the 0.017 lb/MMBtu limit assumed in our review. Based on this, we concluded that 90% NOx control by SCR is achievable in practice and reasonable to assume in the cost analysis.[1]

- The company assumed 3% sales tax. Does Oregon charge sales tax for pollution control projects? Please note, the revised 7th edition of the CCM does not include sales tax in the cost analysis.

- The company assumed property taxes for the PCE on each CT. Does Oregon charge property taxes on this equipment? Please note, the revised 7th edition of the CCM does not include property tax in the cost analysis.

- The company assumed a cost of $2,765,000 to $3,712,500 for combustion controls in addition to SCR on the CTs—is it assumed the applicant would need both controls to achieve 75% NOx reductions? What is the basis for this?

- The company assumed $105,326 to $143,628 in administrative charges for each CT. This seems high. (Note when using the revised 7th Edition CCM, the estimated administrative charges are roughly $3000/year in 2019$.) What is the basis for these annual costs?

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[1] When restricting the dataset to small combustion turbines (< 250 MMBtu/hr heat input) we found six examples of natural gas-fired emission units with SCR achieving lower NOx emission rates than what was assumed in our analysis.

- The company used a 5% interest rate and a 20-year equipment life. We agree with DEQ that unless additional source-specific documentation can be provided, the current bank prime rate (3.25%) should be assumed. In addition, we used the 30-year equipment life assumption recommended by Oregon DEQ.

- **NPS Revised Analysis for Station 12:** The NPS re-evaluated the costs of controls for the three turbines at compressor station No. 12 using the more recent 7th edition CCM & fixed the issues noted above. We found the following:

  - Using PSEL assumptions, the costs to add SCR to turbines 12-A and 12-B are significantly lower than DEQ's $10,000/ton threshold at $1,833/ton of NOx removed for unit 12-A and $3,801/ton of NOx removed for unit 12-B. (See attached spreadsheets.) The costs to install SCR on unit 12-C, which is newer than the other two turbines and consequently has far lower NOx emissions, exceeds DEQ's cost threshold when using PSEL assumptions.

  - When using reduced operating scenarios (based on reduced fuel use assumptions), the cost of installing SCR is still below DEQ's cost threshold down to ***16% of full capacity for unit 12-A and 34% of full capacity for unit 12-B***, suggesting that SCR is likely still cost effective under reduced operating scenarios.

  - Therefore, we concur with DEQ's determination documented in a January 21, 2021 letter to the company, that SCR is likely cost effective at units 12-A and 12-B. However, we recommend that DEQ correct some of the additional errors identified in the cost analysis (other than interest rate and equipment life), as this results in SCR being a much more cost effective option than estimated by DEQ or the company. Spreadsheets documenting our revised analyses are attached.

Gas Transmission Northwest Compressor Station No. 13:

- The company did not use the most recent 7th edition CCM. Why wasn't the most recent version of the CCM SCR chapter used?

- The company assumed a 75% control efficiency. This seems low for SCR. What is the basis for this assumption? As described below, our analysis assumed 90% control. This is equivalent to a controlled NOx limit of 0.017 lb/MMBtu for unit 13-D and 0.016 lb/MMBtu for unit 13-C. The CCM states: "In practice, commercial coal-, oil-, and natural gas–fired SCR systems are often designed to meet control targets of over 90 percent."

  We reviewed the most recent (2020) CAMD information to verify whether the NPS assumed emission rate at 90% control was reasonable (i.e., achieved in practice) for natural gas-fired combustion turbines—we did not include combined cycle units in this review. There are over 100 combustion turbines in the CAM database with emission rates at or below the 0.016 lb/MMBtu limit assumed in our review. Based on this, we concluded that 90% NOx control by SCR is achievable in practice and reasonable to assume in the cost analysis.[2]

- The company assumed 3% sales tax. Does Oregon charge sales tax for pollution control projects? Please note, the revised 7th edition of the CCM does not include sales tax in the cost analysis.

- The company assumed property taxes for the PCE on each CT. Does Oregon charge property taxes on this equipment? Please note, the revised 7th edition of the CCM does not include property tax in the cost analysis

- The company assumed a cost of $2,765,000 for combustion controls in addition to SCR on the CTs—is it assumed the applicant would need both controls to achieve 75% NOx reductions? What is the basis for this?

- The company assumed $105,326 in administrative charges for each CT (13C and 13D). This seems high. (Note when using the revised 7th Edition CCM, the estimated administrative charges are roughly $3000/year in 2019$.) What is the basis for these annual costs?

- The company used a 5% interest rate and a 20-year equipment life. We agree with DEQ that unless additional source-specific documentation can be provided, the current bank prime rate (3.25%) should be assumed. In addition, we used the 30-year equipment life assumption recommended by Oregon DEQ.

- **<u>NPS Revised Analysis for Station 13</u>**: The NPS re-evaluated the costs of controls for the three turbines at compressor station No. 13 using the more recent 7th edition CCM & fixed the issues noted above. We found the following:

  - Using PSEL assumptions, the costs to add SCR to turbines 13-C and 13-D are significantly lower than DEQ's $10,000/ton threshold at $4,074/ton of NOx removed for unit 13-C and $3,887/ton of NOx removed for unit 13-D. (See attached spreadsheets.)

  - When using reduced operating scenarios (based on reduced fuel use assumptions), the cost of installing SCR is still below DEQ's cost threshold down to ***37% of full capacity for unit 13-C and 35% of full capacity for unit 13-D***,

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[2] When restricting the dataset to small combustion turbines (< 250 MMBtu/hr heat input) we found six examples of natural gas-fired emission units with SCR achieving lower NOx emission rates than what was assumed in our analysis.

suggesting that SCR is likely still cost effective under reduced operating scenarios.

- Therefore, we concur with DEQ's determination, documented in a January 21, 2021 letter to the company, that SCR is likely cost effective for units 13-C and 13-D. However, we recommend that DEQ correct some of the additional errors identified in the cost analysis (other than interest rate and equipment life), as this results in SCR being a much more cost effective option than estimated by DEQ or the company. Spreadsheets documenting our revised analyses are attached.